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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/025,671	12/26/2001	Douglas N. Curry	101256.01	8406

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OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, VA 22320

EXAMINER

DO, ANH HONG

ART UNIT	PAPER NUMBER
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2624

DATE MAILED: 02/26/2003

15

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
10/025,671

Applicant(s)
Curry

Examiner
Anh Hong Do

Art Unit
2624



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Feb 11, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7 and 10-12 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8, 9, and 13-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/11/2003 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

With respect to the applicant's argument that Shannon does not disclose or suggest decompressing a single byte of compressed data to produce four pixels of non-continuous tone data, after a close review taken place, it is noted that Shannon clearly decompresses the Sync byte (i.e., the single byte) by extracting the four pixels 0 to 3 therefrom, and these 4 pixels belong to a line of dithered image data (i.e., the line art or the non-continuous tone data) (see col. 10, lines 30-46). As discussed during the interview on 12/19/2002, the decompressor actually extracts the 4 pixels, namely 0 to 3, from the sync byte (i.e., a single byte). It is not understandable that the decompressor extracts the displacement of 0-3 pixels from the sync byte since a byte consists of 8 bits, each expresses a 1 or 0 pixel in a binary format; thus, what being extracted from the byte must be pixels, not their displacement.

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Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al. (U.S. Patent No. 5,774,634) in view of Hsu et al. (U.S. Patent No. 6,389,176 B1) and Curry (U.S. Patent No. 5,485,289).

Regarding claim 1, Honma discloses:

- decompressing data from the compressed data bitword to provide data indicative of the plurality of explicit pixels (Fig. 4: decompressing data by decode ckt 12);
- synthesizing data from the compressed data bitword to provide data corresponding to a synthesized pixel (Fig. 4: synthesizing data by image synthesis unit 6).

One skilled in the art would have clearly recognized that the method of Honma is capable of reproducing high quality image (col. 3, lines 60-62). Honma does not specifically teach discarding pixels along a direction parallel to an edge while maintaining pixels along a direction perpendicular to the edge, and the at least one synthesized pixel representing at least one discarded pixel.

Hsu, in the same field of endeavor, discloses:

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- discarding pixels along a direction parallel to an edge (col. 5, lines 23-25, teaches an erosion operation for removing pixels from the edge), and the at least one synthesized pixel representing at least one discarded pixel (col. 5, lines 51-59, teaches the synthesis process the synthesized pixel implicitly represents the discarded pixel in the odd samples), wherein the synthesis operation is to enhance edge information and reconstruct a high-quality image (col. 3, lines 11-16).

And Curry teaches no intermediate gray values if the feature edge is perpendicular to the fastscan direction and the appropriate gray value will be assigned to the memory location if the feature edge is parallel with the fastscan direction (col. 20, lines 7-18), which implies that the pixels are maintained along a direction perpendicular to the edge and changed or removed along a direction parallel to an edge. The Curry's device independent gray data allows efficient rendering of images of the highest quality (col. 4, lines 29-30).

Therefore, it would have been obvious for Honma to discard pixels along a direction parallel to an edge and maintain those along a direction perpendicular to the edge, and represent the synthesized pixel by the discarded pixel as taught by Hsu and Curry in order to reproduce high quality images.

Regarding claim 2, although Honma, Hsu and Curry do not specifically teach that decompressing a quantity of non-continuous tone data is increased to approximately 4 times of a quantity of uncompressed non-continuous tone data present in a plurality of bitwords representing a plurality of pixels, such a limitation is merely a matter of design choice and would have been

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obvious in the method of Honma, Hsu and Curry. Honma teaches that in compression the quantity of data is reduced (or compressed) (col. 14, lines 27-29), and it will be expanded in the decompression step since the expansion circuit performs the reverse operation to that performed by the compression circuit (col. 13, lines 4-6); in other words, the data is increased in decompression step. The limitation in claim 2 does not define a patentably distinct invention over that in Honma since both the invention as a whole and Honma, Hsu and Curry are directed to increasing data. The magnitude in which the data is increased is inconsequential for the invention as a whole and presents no new or unexpected results, so long as the data is successfully increased. Therefore, to have the data quantity in decompression to be increased approximately 4 times of that of the uncompressed data would have been obvious design choice to one of ordinary skill in the art.

Regarding claim 3, Honma discloses decompressing the non-continuous data with high resolution in one dimension into a high resolution bitmap (Fig. 4: bitmap development unit 3, decode ckt 12 and image synthesis unit 6).

Regarding claim 4, Honma teaches:

- identifying a bit word as continuous tone data (Fig. 4: discrimination ckt 2);
- decompressing continuous tone data to provide image data for a single pixel at a highest spatial resolution corresponding to a plurality of pixels (Fig. 4: decode ckt 12 and col. 1, lines 44-63).

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Regarding claim 5, Hsu teaches bitwords of information corresponding to discarded non-continuous tone data are synthesized (col., lines 51-59, teaches the synthesis process the synthesized pixel implicitly represents the discarded pixel in the odd samples).

Regarding claim 6, Honma discloses each of bitwords are bytes (col. 24, lines 21-23).

Regarding claim 8, Honma teaches synthesizing the data is performed in either a fastscan direction or a slowscan direction based on a direction bit contained that bitword (Fig. 13: main-scan direction or sub-scan direction).

Regarding claim 9, Honma discloses determining which pixel positions are to be synthesized during decompression based on the direction bit (col. 20, lines 10-13).

5. Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honma et al. (U.S. Patent No. 5,774,634) in view of the prior art described in the application (PAA) and Curry (U.S. Patent No. 5,485,289).

Regarding claim 15, Honma discloses:

- a decompressor that decompresses a data bitword map to provide high spatial resolution data containing non-continuous tone data, and that decompresses the data bitword map to provide low spatial resolution continuous tone data (Fig. 4: decode ckt 12 and col. 1, lines 44-63).

One skilled in the art would have clearly recognized that the decoder in Honma is to reproduce high quality image (col. 3, lines 60-62). Honma does not specifically teach using extra resolution in a direction perpendicular to an edge of marks to provide the high resolution data containing non-continuous tone data.

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The PAA, in the same filed of endeavor, teaches providing high spatial resolution data containing non-continuous tone data using extra resolution across edges of marks (specification, page 1, lines 15-25, teaches more spatial resolution needed to render non-continuous tone regions than to render continuous tone regions), wherein the image data process is performed by a high quality scanner to implicitly obtain a high quality image (specification, page 2, lines 5-8).

And Curry teaches no intermediate gray values if the feature edge is perpendicular to the fastscan direction (col. 20, lines 7-11), which implies that the pixels are changed or discarded along a direction perpendicular to the edge so as to maintain a high spatial resolution. The Curry's device independent gray data allows efficient rendering of images of the highest quality (col. 4, lines 29-30).

Therefore, it would have been obvious for Honma to use extra resolution in a direction perpendicular to an edge of marks to provide the high resolution data containing non-continuous tone data as taught by PAA and Curry in order to reproduce high quality images.

Regarding claims 16 and 17, Honma discloses the image forming device is an ink jet printer (col. 6, lines 50-51).

Claim Rejections - 35 U.S.C. § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who

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has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 13 and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Shannon et al. (U.S. Patent No. 6,026,196).

Regarding claim 13, Shannon discloses:

- decompressing a single byte of compressed data to produce 4 pixels of non-continuous tone data (col. 10, lines 43-46, teaches decompressing the Sync byte (i.e., the single byte) by extracting the four pixels 0 to 3 therefrom, and these 4 pixels belong to a line of dithered image data (i.e., the line art or the non-continuous tone data).

Regarding claim 14, Shannon teaches:

- transmitting the byte of data to a print engine (col. 9, lines 26-28);
- extracting data necessary to render two non-continuous tone data pixels and fabricating two more non-continuous tone data pixels in a low spatial resolution direction based on a set of values of the extracted data (col. 10, lines 43-46).

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Allowable Subject Matter

8. Claims 7 and 10-12 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

Regarding to independent claim 7, the present invention provides a new method for compression and decompression that at least double the spatial resolution for non-continuous tone data, while maintaining adequate spatial resolution for continuous tone data and minimizing the amount of memory and corresponding transmission bandwidth requirements (specification, page 3, lines 4-8). Particularly, the new method comprising the following features, which the prior art, taken either singly or in combination, does not teach:

- referencing a segmentation bit of the bitword to determine whether the bitword contains non-continuous tone data;

- referencing a direction bit to determine whether the direction of the edge located in spaced relationship to the first and second pixels;

- referencing the three bit value indicative of a first pixel;

- referencing the three-bit value indicative of the second pixel.

Regarding independent claims 10-12, the present invention provides a new method for compression and decompression, in which the high spatial resolution non-continuous tone data is compressed by quantizing and packing high resolution pixels in a direction across the edge, i.e., perpendicular to an edge of mark to be rendered, and discarding high resolution pixels along the edge, i.e., parallel to edge; additional information, called tag bits, indicating the directions of edge,

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i.e., vertical or horizontal directions, and the type of image data, i.e., continuous or non-continuous tone data, is also stored to enable decompression (specification, page 4, lines 4-10). Particularly, the new method comprising the following features, which the prior art, taken either singly or in combination, does not teach:

- *synthesizing the data comprising rendering from each bitword twice as many pixels in a direction perpendicular to an edge indicated by the direction bit of that bitword;*
- *using the three bit value associated with the first pixel and the three bit value associated with the second pixel in the compressed data bitword to determine slope in the slow/fast scan direction to render the horizontal/vertical edge.*

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh Hong Do whose telephone number is (703) 308-6720.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700 or 4750.

The fax phone number for this Group is (703) 872-9314.

February 24, 2003.



ANH HONG DO
PATENT EXAMINER